LAW OFFICES OF
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PATENT, TRADEMARK, COPYRIGHT,
UNFAIR COMPETITION, TRADE-SECRET,
COMPUTER & HIGH-TECHNOLOGY LAW

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September 25, 2000

Asst. Commissioner for Patents
Washington, D. C. 20231

RE: utility-patent application 08/959,575 filed Oct. 28, 1997
of Rolf E. Carlson
for "SYSTEM FOR GENERATING RANDOM NUMBERS USING A UNIVERSAL GAMING ENGINE"
our docket xRCa-03

Dear Sir:

Responsive to your Official Action of May 23, 2000, please find for filing the enclosed:

- *new* executed power of attorney;
- one-month time-extension petition authorizing fee to be charged to deposit account;
- response of 18 typed pages; and
- acknowledgment card for date-stamping and return;

Please change the correspondence address to read as follows:

Peter I. Lippman
4385 Ocean View Blvd.
Montrose, California 91020

If any deficiency in fees becomes due, or any refund accrues, anytime during prosecution of this case, you are hereby authorized to proceed, without specific authorization, to charge such fee or credit such refund to our deposit account 12-1639. A duplicate copy of this letter is enclosed.

Cordially,

Peter I. Lippman
Registration No. 22,835
Attorney for the Applicants

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Cordially,

Peter I. Lippman
Registration No. 22,835
Attorney for the Applicants

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KW-S
10-17-00

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Rolf Carlson, Ph. D.	Group Art Unit:	
Serial No.:	08/959,575		
Filed:	October 28, 1997		2767
Title:	"SYSTEM FOR SUPPLYING SCREENED RANDOM NUMBERS FOR USE IN RECREATIONAL GAMING IN A CASINO OR OVER THE INTERNET"		
		Examiner	
Our docket:	xRCa-03	Douglas Meislahn	

AMENDMENT

Hon. Commissioner of Patents
and Trademarks
Washington, D. C. 20231

Sir:

This is responsive to the Official Action dated May 23.

I hereby certify that this correspondence is being deposited as first-class mail in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D. C. 20231, on

September 25, 2000

Peter I. Lippman, Registration 22,835

REMARKS

Applicant thanks Examiner Meislahn for having withdrawn the previous grounds of rejection. For the reasons given be-

low, however, the Applicant respectfully traverses the newly stated grounds.

Section 112 rejections

(a) Enablement — In the Official Action it is said that the application fails to adequately teach how to practice the invention, particularly as to "the population size of the sets of random numbers", "the cutoff point for randomness", and the value of "alpha". With respect, the Applicant's specification both teaches testing of every set of numbers and specifies certain tests including the Runs Test, K-S test, and Chi-square test, to determine randomness.

Given these specific instructions, sizing the sets and performing the tests themselves when so instructed is wholly straightforward, within the ordinary skill in the art. In particular the cutoff point for establishing sample size for determining randomness through these tests is dictated by the particular test — and also is well known, not only to mathematicians versed in statistics but in fact even to readers of most undergraduate textbooks in statistics.

Thus taking (merely as an example) the use of the Chi-square test for this purpose, customary choices for the test

parameters will most typically yield a sample size of twenty-five to five hundred as a representative cutoff point for the size of a population to be considered "large" and therefore accessible to standard techniques for investigating randomness. (Of course larger sets can be chosen if preferred.) Exact values for the test parameters, and therefore the population size, are a matter of judgment and design choice for the system designer.

A discussion of such determinations appears for instance in the familiar text of Mendenhall, *Statistics for Management and Economics* (PWS-Kent Publishing, Boston 1989). The relevant page is attached to this response.

The point is that the parameters and their selection are well within the skill of the art. Once the sample has reached the sufficient size determined in this well-known way, the corresponding set of numbers can be tested for randomness by the well-known tests.

Sample size appropriate for randomness verification can be selected by a system designer of ordinary skill in the art, who will recognize that the size is bounded:

- below by acceptable practice for determining the minimum size of a random sample according to the test(s) that will be performed, and
- above by the physical resources of the machine.

The designer necessarily will then instantly recognize that each set of potentially random numbers delivered to the verifier for testing must be in the acceptable range for testing. We are entitled to assume that the person of ordinary skill in the art is not a rocket scientist, but here we could also assume some generalized level of competence as a system designer.

The term "alpha" appears neither in the claims nor (as far as the undersigned can determine) in the specification. Thus the concept of "alpha" appears to be first introduced by the Official Action itself — and then questioned in the Official Action. Applicant will gladly attempt to answer the question if the Examiner would care to indicate what is meant by "alpha".

(b) Definiteness — In the Action it is also said that the word "substantially" as used in the claims lacks a requisite standard. This term, however, is used only to draw a

line that prevents competitors from enjoying the benefits of the basics of Applicant's invention while escaping from the literal language of the claims.

In other words the term is included so that a person who wishes to design around the claims must do more than simply:

- deliberately insert an occasional number — once in each twenty or fifty sets, for instance — that is perfunctorily limited to some specific (large) number of digits, or

- deliberately generate an occasional set that is not substantially long-term random or pseudo-random — knowing, cynically enough, that the verifier will intercept and discard that set! — or

- deliberately discard some percentage or some occasional individual instances of the perfectly good sets even though they have successfully passed the verification stage, once again just in an effort to circumvent the literal claim language, or

- deliberately interrupt the continuous provision of sets from the verifier, from time to time, for some inconse-

quential time interval, even if disguised within some arguably legitimate system delay but actually just for purposes of avoiding the claim.

The word "substantially" is very commonplace within patent claims and generally for purposes such as outlined above. Applicant respectfully submits that ample caselaw authorizes such routine precautions against nefarious behavior.

Section 103 rejections

In the Official Action it is further said that the invention as claimed is obvious over the so-called "admitted prior art", Wilke and Vasseur. In constructing this argument, it is argued in the Action that (in summary):

a. "admitted" art doesn't require all sets to look random,

b. but Wilke says that sets should be "felt" random, and

c. Vasseur teaches how to verify randomness; SO . . .

d. it's obvious to hook up Vasseur's verifier to keep non-random sets out of Wilke and other admitted-art games.

The Applicant respectfully traverses this line of reasoning and the associated rejections, for the reasons indicated here for each of the above points in turn:

(a) The "admitted" prior art, and the actuality and appearance of randomness — At the outset, simply as a matter of semantics, Applicant with greatest respect takes issue with the use of the pejorative term "admitted". Such a characterization seems to virtually make a criminal offense out of submitting a patent application which brings forth prior art and describes that art.

Applicant thus has not "admitted" but rather adduced prior art. This is done in the interest of helping both the Examining corps and the skilled artisan to position the invention with respect to what has come before. It is thus more in the nature of a public service than a statement against interest.

Now turning to the substance of the matter, in this case what is truly important to recognize about the prior art is that regulators do test sets of numbers extracted from gaming systems. This is done on a spot-check basis, both with proposed new games and also after games are in the field, *i. e.* in use.

Thus it is entirely commonplace for artisans in the gaming field — in the year 2000, and in the years 1999 and 1998 etc. — to test sets of numbers for randomness, and they do know how to do it with big sets and with little sets. They know how many numbers to accumulate in sets for this purpose, and they know what randomness looks like too, just as discussed above in regard to enablement.

What is lacking is systematic testing of substantially every set of numbers — particularly the short sets delivered to particular games for particular rounds of play — before use, in every game, every time. In the present-day gaming field, this is not done.

There are two basic concerns: (1) use of a high-quality modern RNG recognized as providing a longterm random/pseudo-random series of numbers ensures that all the games are fair, and (2) systematic testing of the short sets ensures that every game looks/feels fair too.

One main point of the invention is that both the actuality and the look/feel are important. A truly legitimate overall gaming system ought to have both, and the invention provides both — but the combination of references proposed in the Official Action, as will be shown momentarily, does not provide both.

(b) Wilke, and what is "felt . . . [to be] sufficient" to ensure randomness — The patent to Wilke is nonanalogous art with respect to the present application. Wilke ought not be cited at all in this case, since Wilke is not a casino or Internet type of game that supports wagering as between a player and a "house".

Rather Wilke is only an arcade game in which two players compete for fun only, against each other for the cost of a quarter — or maybe nowadays a dollar — in the coin slot. In Wilke, some semblance of the look/feel of fairness is desired, and that is precisely why Wilke discusses what may be "felt" to be random and thus fair.

What Wilke does not do, and cannot do, is provide long-term randomness, or randomness in the serious-minded sense that is demanded for serious casino/Internet gaming. This is absolutely clear from his description of using his single game-timing counter — which he subdivides into fourths or the like — to provide several random-appearing series of numbers concurrently.

Thus Wilke's source of random-seeming numbers is of the same type as a children's simple electronic game which runs a four- or five-bit electronic counter, starting when the game is started or restarted, and ending when a child presses an event button to initiate some later action in the game. The

counter "spins" electronically, generating a quickly circulating or cycling series of $2^4 = 16$ or $2^5 = 32$ numbers.

These numbers are then used to select a particular response to the event button. With 16 or 32 possible outcomes, determined by a counter that circulates many times per second during a period when no one can see the counter or cares to keep track of the amount of time that has elapsed, a perfectly valid sense of randomness is achieved — at the level of a children's game.

The same is generally true for Wilke's arcade "football" game, as seen in the passage cited in the Official Action: "The register 206 is split up into three four-bit words comprising the S, Y, and E variables. Thus it takes approximately one-half of a second to completely go through all of the combinations of these variables."

In particular it appears from Wilke's description that the left-hand (most-significant four bits) one-third end of his counter may be more predictable than the right-hand (least-significant four bits) one-third end of the same counter, since the left-hand end circulates much more slowly.

As a practical matter, it's true that it might be quite difficult for typical, "fun only" players to appreciate what is going on in the selection of game responses in Wilke. That, however, is only because — for a fun-only arcade game

— there is no point in investing the time, effort or other resource that would be needed to "crack" the system and be able to predict the longterm behavior of the game. What is inadequate in the arcade-game context is motivation.

Beyond any question, however, Wilke's approach would never pass serious gaming regulation, where standards of "crackability" are far, far more rigorous. In his system, in each game, play determines the outcome of the variables that are supposed to be "random": such a system offers the player opportunities to estimate play states through their interaction with the machine.

Furthermore, a fundamental requirement for regulation of a random-number generator is that it be able to exist in a casino for the entire life of the game in the casino, without ever "wrapping around" — *i. e.* duplicating numbers previously used for an earlier play of the given game. Wilke's system duplicates numbers multiple times in virtually every play of the game! Again, he says clearly that "it takes approximately one-half of a second to completely go through all of the combinations of these variables." (emphasis added)

Periodicity is a feature of all deterministic systems for generating random or pseudorandom numbers, but short periodicity is a strongly undesired feature of all such systems used for gaming. This is also the reason for requir-

ing large bit lengths in the generated numbers. Wilke's system, as he describes it, uses extremely short bit lengths — only four bits per number, as quoted above.

In fact, a primary reason for creation of stand-alone random-number generators is to remedy exactly those systematic problems that occur with schemes such as described above in Wilke — which lead to nonrandom and therefore nonfair play. Wilke's system could not exist in a casino, in the modern regulatory environment, even for one single game device — and is therefore grossly insufficient for a system which is to provide the needs of multiple regulated games.

In summary, Wilke's approach would never satisfy regulation since spinning a counter is insufficient to guarantee the degree of randomness demanded in regulated gaming. Wilke fails to teach a device that could be regulated, and offers nothing that would be usable in the context of "multiple games of chance . . . in a casino or over the Internet" as claimed. The Applicant therefore respectfully submits that Wilke is improperly cited in the present application.

(c) Vasseur's system for checking randomness — Vasseur does nothing more than demonstrate that textbook statistics can be implemented in hardware. The question here, however, is just which statistics should be implemented in just what

hardware to accomplish specifically what purpose in precisely which game or games. Here Vasseur quite evidently leaves us in the dark.

(d) The combination of references — As to constructing a combination of the cited references, Applicant respectfully points out four reasons that the combination is improper. First, Wilke is nonanalogous art with respect to Vasseur (as well as, per the preceding section, the present invention); hence Wilke is not properly combined with Vasseur.

Second, it is settled law that references cannot be combined to defeat a claim absent some suggestion of the combination in at least one of the references. There is no such impetus, no suggestion, whatsoever seen in either Vasseur (he is not interested in "for fun only" arcade games) or Wilke (he is not interested in real longterm randomness, but only in what is "felt" to be short-term random).

Third, even if Wilke were combined with Vasseur, what would result might be an arcade game with a short-bit-length electronic counter, at most perhaps spot-checked for randomness by an abstract mathematical verifier. That is to say, the combination fails to come up to the claimed invention — and the reason it fails is that the references lack critical elements.

Some such elements of particular interest are the testing of substantially every set of candidate numbers in an ongoing continuous stream of candidate-number sets, and the provision of successfully verified sets on a likewise-continuous basis for use in multiple games. That concept is introduced first and only by the Applicant.

The combination also fails to come up to the claimed invention in another way: this invention represents a major paradigm shift in gaming quality control. Rather than relying on certification of an RNG in a game by a gaming authority before the game is authorized for use in the field, and with some spot-checks thereafter, the invention provides an on-board verification unit that assures quality control for the life of the game, and for EVERY round of play, even though the game is in the field. The Applicant's verification unit provides a stringent standard of ongoing, continuing game quality that is eons ahead of the pretesting and spot-testing that now represent the state of the art in the gaming industry.

Fourth, if there were any reason to suppose it obvious to combine Vasseur and Wilke with Applicant's adduced art, that reason would be dashed by the fact that Wilke's device

was published in the 1970s, and Vasseur's RNG invention in the 1960s. This means:

(1) Wilke himself must be charged with knowledge of Vasseur, published a half-decade before Wilke filed, and if the combination were obvious then Wilke himself would have perceived and mentioned it; and

(2) both references have been available to the skilled artisan and inventing public for more than twenty years now, but prior art combining them does not seem to be available in the present prosecution.

The Applicant respectfully notes that the line of reasoning presented fourth in the immediately preceding paragraph, with its two numbered subparagraphs, in recent years has been specifically endorsed by the high appellate patent courts. If it was so obvious, then why has it been left to the Applicant to first propose it?

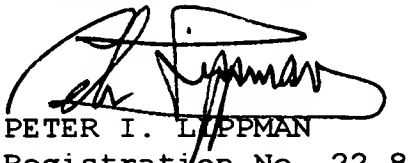
Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully requests the Examiner's favorable reconsid-

eration and allowance of the claims now standing in this case.

It is respectfully requested that, should there appear any further obstacle to allowance of the claims herein, the Examiner telephone the undersigned attorney to try to resolve the obstacle.

Respectfully submitted,



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September 25, 2000

STATISTICS FOR MANAGEMENT AND ECONOMICS

◆ ◆

SIXTH EDITION

William Mendenhall
Professor Emeritus, University of Florida

James E. Reinmuth
University of Oregon

Robert Beaver
University of California, Riverside

PWS–KENT Publishing Company
Boston

The SPSS printout in Table 17.20 differs somewhat from the other two in that four entries are displayed for each cell in the contingency table. From top to bottom, these entries are the observed cell frequency, the cell frequency expressed as a percentage of the row total, the column total, and the grand total. The estimated expected frequencies are not given. For example, the cell in the first row and first column had an observed frequency of 249. This frequency represented 26.4% of 944, the first row total; 90.5% of 275, the first column total; and 24.9% of 1,000, the grand total. The value $X^2 = 13.24589$; the degrees of freedom, D.F. = 2; and the observed significance level of .0013 are found directly below the table. Other statistics usually given in the printout are not relevant to our analysis.

The information as well as reported decimal accuracy varies from one printout to another, but the basic information is the same. All three printouts show the calculated value of X^2 and the corresponding degrees of freedom. These quantities, together with the critical values found in Table 5 of the Appendix, are all that we need to test for independence of the classification variables represented in the contingency table. The value of the observed significance level given in the SAS and SPSS printouts eliminates the need for the chi-square table and directly gives us a measure of the evidence favoring the rejection of the null hypothesis of independence.

17.8 Assumptions

The following assumptions must be satisfied if X^2 is to possess, approximately, a chi-square distribution and, consequently, if the tests described in this chapter are to be valid.

Assumptions

1. The cell counts, $n_1, n_2, \ldots, n_k$, satisfy the conditions of a multinomial experiment (or a set of multinomial experiments created by restrictions on row or column totals).
2. The expected values of all cell counts should equal or should exceed 5.

Assumption 1 must be satisfied. The chi-square goodness-of-fit tests, of which these tests are special cases, compare observed frequencies with expected frequencies and apply only to data generated by a multinomial experiment.

The larger the sample size n, the more closely the chi-square distribution will approximate the distribution of X^2. We have stated in assumption 2 that n must be large enough so that all the expected cell frequencies will be equal to 5 or more. This is a safe figure. Actually, the expected cell frequencies can be smaller for some tests. For information on the minimum expected cell frequencies for specific goodness-of-fit tests, see the paper by Cochran listed in the references.